

## CLAIMS

What is claimed as being new and desired to be protected by LETTERS PATENT of the United States is as follows:

1. A remediation system for separating larger particles from smaller particles and dewatering the resulting products comprising, in combination:

a primary scalping screen adapted to receive a first stream comprised of a slurry of various sized particles and moisture, the primary scalping screen further being able to skim off a second stream comprised of particles greater than the screen opening, and the primary scalping screen allowing a third stream to pass through, the third stream comprised of particles less than the screen opening;

a primary sump and a primary pump being adapted to receive the third stream by the flow of gravity and to output a fourth stream;

a large diameter maximum density separator with flocculant injection ring to receive the fourth stream and select components of the fourth stream based upon site-specific nature and discard a fifth stream which is comprised of a primary sand product, the output of the large diameter maximum density separator being a sixth stream which is comprised of particles greater than 40 to 75 micrometers and less than the primary scalping screen opening;

a secondary sump and a secondary pump being adapted to receive the sixth stream by the flow of gravity and to output a seventh stream;

a small diameter maximum density separator with flocculant injection ring to receive the seventh stream and to select components based upon the site-specific nature and discard an eighth stream which is comprised of particles between about 20 and 40 micrometers in size, the output of the small diameter maximum density separator fed to a ninth stream;

a static sieve screen to receive the eighth stream by the flow of gravity and functioning to remove the solids in a tenth stream, the static sieve screen having openings ranging from between 300 and 500 micrometers, the small particles that pass through the screen leaving by the flow of gravity as an eleventh stream;

a flocculation sump to collect the ninth stream by the flow of gravity and allow the flocculated material of the ninth stream to settle and clarified water to overflow from the secondary sump as a twelfth stream and discharge a thirteenth stream by gravity, the thirteenth stream including thickened solids:

a vibrating screen with a high rotational speed and low amplitude adapted to dewater the input, the vibrating screen adapted to receive the tenth stream and the thirteenth stream, the output of the vibrating screen adapted to include a

fourteenth stream which is strong with flocculated solids and to include a fifteenth stream adapted to include water extracted from the input streams;

a horizontal dewatering device consisting of two parallel polyurethane rollers in an enclosed collection box, the horizontal dewatering device being adapted to input the fourteenth stream and a nineteenth stream which includes reagents to improve the quality of the output seventeenth output stream which is the secondary product pile and which consists of dewatered solids while the extracted water constitutes an output which is a sixteenth stream;

a tertiary sump and a tertiary pump to collect the eleventh stream, fifteenth stream and sixteenth stream and to discharge the collected solids and water through an eighteenth stream;

streams 5 and 17 being combined and mixed in a pugmill to produce the final product; and

a secondary flocculation tank to receive an eighteenth stream 18 whereat solids are extracted as needed and the outflow water is similar to the twelfth stream.

2. A remediation system comprising:

a primary scalping screen;

a primary sump and a primary pump;

a large diameter maximum density separator with flocculant injection ring;

a secondary sump and a secondary pump;

a small diameter maximum density separator with flocculant injection ring;

a static sieve screen;

a flocculation sump;

a vibrating screen;

a dewatering device;

a tertiary sump and a tertiary pump;

a secondary flocculation tank;

a pugmill; and

screens to move water and particulates through the above listed components for separating larger particles from smaller particles and to dewater the particles.

3. The system as set forth in Claim 2 wherein the primary scalping screen has one inch openings.

4. The system as set forth in Claim 2 wherein the large diameter maximum density separator is sized to separate out particles between 74 micrometers and one inch.

5. The system as set forth in Claim 2 wherein the small diameter maximum density separator is sized to separate out particles between 20 and 40 micrometers.

6. The system as set forth in Claim 2 wherein the static sieve screen has openings in the range of between 300 and 500 micrometers.

7. A method of remediating soils and sediments comprising:  
providing a primary slurry through a first stream comprised  
of gravel, sand, silt, clay, organic matter and moisture;  
providing next a primary scalping screen having 1 inch  
openings;  
providing next a primary sump and a primary pump;  
providing next a large diameter maximum density separator  
with flocculant injection ring;  
providing next a secondary sump and a secondary pump;  
providing next a small diameter maximum density separator  
with flocculant injection ring;  
providing next a static sieve screen;  
providing next a flocculation sump;  
providing next a vibrating screen with a high rotational  
speed and low amplitude;  
providing next a horizontal dewatering device consisting of  
two parallel polyurethane rollers in an enclosed collection box;  
providing next a tertiary sump and a tertiary pump;  
providing a pugmill;  
providing next a secondary flocculation tank;  
introducing the primary slurry into the primary scalping  
screen;  
screening out 1 inch and larger particles from the primary  
slurry;

separating out particles between 40 micrometers and 1 inch with the large diameter maximum density separator and injecting flocculants;

separating out particles between 20 and 40 micrometers with the small diameter maximum density separator and injecting flocculants;

mixing the remaining slurry with flocculant and discharging water;

screening 500 micrometer and larger particles to vibrator and discharging water with the static sieve screen;

vibrating flocculated solids and 500 micrometer particles and discharging the water to the tertiary sump through the vibrating screen;

pressing solids between rollers and discharging water to the tertiary sump and combining solids with the primary sand product in a pugmill; and

mixing sump water with the flocculant discharge water and returning it to the source through the tertiary sump.